



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,129	12/15/2003	Kenneth J. Young	118114	9151
25944	7590	12/12/2005	EXAMINER	
OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320			KIM, TAE JUN	
			ART UNIT	PAPER NUMBER
			3746	

DATE MAILED: 12/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/734,129	Applicant(s) YOUNG ET AL.	
	Examiner Ted Kim	Art Unit 3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-15 and 17-21 is/are rejected.
- 7) ☒ Claim(s) 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 13-15 rejected under 35 U.S.C. 103(a) as being unpatentable over GB 2288660 in view of any of Ansart et al (5,285,630), Pandalai et al (5,685,157), and Ormerod (4,216,651). GB '660 teaches a combustion chamber for a gas turbine engine comprising at least one Helmholtz resonator 1 (see particularly Fig. 4) having a resonator cavity 2 and a damping tube 3 in flow communication with the interior of the combustion chamber, the tube extends into the interior of the combustion chamber. GB '660 teaches the combustion chamber is a gas turbine combustion chamber and shows the direction of the combustion gas flow in 7, hence, the Helmholtz resonator is positioned on a side wall of the combustion chamber. GB '660 does not specifically teach the combustion chamber is an annular combustion chamber with an inner and outer casing defining an annular region nor the Helmholtz resonator being supported independently of the combustion chamber by the inner casing or outer casing. However, there are only two main classes of combustion chambers used for gas turbine engines, of which the annular combustion chamber is one. Ansart et al teach an annular combustion chamber with

inner liner 11 and outer liner 15 where the use of an air duct 21 or 22 is mounted to the combustion chamber outer casing independently of the combustion chamber. Pandalai et al teach an annular combustion chamber with an igniter 93 that is mounted to the combustion chamber outer casing independently of the combustion chamber 31 as well as the a resonator 100 that is mounted to the combustion chamber outer casing. Ormerod teaches an annular combustion chamber where an igniter 12 is mounted to the combustion chamber outer casing 10 independently of the combustion chamber 13. It would have been obvious to one of ordinary skill in the art to mount the Helmholtz resonator of GB '660 with an annular combustion chamber and independently of the combustion chamber and to an outer casing of the combustion chamber, as taught by any of Ansart et al, Pandalai et al and Ormerod, as a well known class of gas turbine combustor which requires thermoacoustic damping and in order to facilitate thermal expansion and/or to facilitate ease of replacement and/or to place the connections in a relatively low temperature region and thus facilitate greater longevity, corrosion resistance, etc.

3. Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aigner et al (5,373,695) in view of Bodine, Jr (2,807,931). Aigner et al teach a gas turbine combustor with an annular combustion chamber 3 and inner casing 33 and outer casing 34 and a windage shield bounded by 33 and 39. Aigner et al do not teach Helmholtz resonators in the windage shield. Bodine, Jr teaches a Helmholtz resonator 71 on the inner side of the gas turbine combustor (Fig. 2) where the resonator is inherently in

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 13-15 rejected under 35 U.S.C. 103(a) as being unpatentable over GB 2288660 in view of any of Ansart et al (5,285,630), Pandalai et al (5,685,157), and Ormerod (4,216,651). GB '660 teaches a combustion chamber for a gas turbine engine comprising at least one Helmholtz resonator 1 (see particularly Fig. 4) having a resonator cavity 2 and a damping tube 3 in flow communication with the interior of the combustion chamber, the tube extends into the interior of the combustion chamber. GB '660 teaches the combustion chamber is a gas turbine combustion chamber and shows the direction of the combustion gas flow in 7, hence, the Helmholtz resonator is positioned on a side wall of the combustion chamber. GB '660 does not specifically teach the combustion chamber is an annular combustion chamber with an inner and outer casing defining an annular region nor the Helmholtz resonator being supported independently of the combustion chamber by the inner casing or outer casing. However, there are only two main classes of combustion chambers used for gas turbine engines, of which the annular combustion chamber is one. Ansart et al teach an annular combustion chamber with

inner liner 11 and outer liner 15 where the use of an air duct 21 or 22 is mounted to the combustion chamber outer casing independently of the combustion chamber. Pandalai et al teach an annular combustion chamber with an igniter 93 that is mounted to the combustion chamber outer casing independently of the combustion chamber 31 as well as the a resonator 100 that is mounted to the combustion chamber outer casing. Ormerod teaches an annular combustion chamber where an igniter 12 is mounted to the combustion chamber outer casing 10 independently of the combustion chamber 13. It would have been obvious to one of ordinary skill in the art to mount the Helmholtz resonator of GB '660 with an annular combustion chamber and independently of the combustion chamber and to an outer casing of the combustion chamber, as taught by any of Ansart et al, Pandalai et al and Ormerod, as a well known class of gas turbine combustor which requires thermoacoustic damping and in order to facilitate thermal expansion and/or to facilitate ease of replacement and/or to place the connections in a relatively low temperature region and thus facilitate greater longevity, corrosion resistance, etc. Another embodiment in Fig. 6 shows the use of multiple Helmholtz resonators 150 which are diametrically opposed and having different volumes and successively smaller volumes. It would have been obvious to one of ordinary skill in the art to employ multiple Helmholtz resonators, in order attenuate multiple frequencies which are detrimental to combustion and/or to attenuate the frequencies at multiple locations that are exposed to the detrimental effects.

3. Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aigner et al (5,373,695) in view of Bodine, Jr (2,807,931). Aigner et al teach a gas turbine combustor with an annular combustion chamber 3 and inner casing 33 and outer casing 34 and a windage shield bounded by 33 and 39. Aigner et al do not teach Helmholtz resonators in the windage shield. Bodine, Jr teaches a Helmholtz resonator 71 on the inner side of the gas turbine combustor (Fig. 2) where the resonator is inherently in a windage area as there is no airflow illustrated in that region. It would have been obvious to one of ordinary skill in the art to place the Helmholtz resonators within the windage shield of Aigner et al, as a protected location and/or analogous location taught by Bodine, Jr for Helmholtz resonators. Bodine, Jr does not teach in the embodiment of Fig. 2, multiple Helmholtz resonators although multiple resonators in general are taught.

4. Claims 20, 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over GB 2288660 in view of Bodine, Jr (2,807,931). GB '660 teaches a combustion chamber for a gas turbine engine comprising at least one Helmholtz resonator 1 (see particularly Fig. 4) having a resonator cavity 2 and a damping tube 3 in flow communication with the interior of the combustion chamber, the tube extends into the interior of the combustion chamber. GB '660 teaches the combustion chamber is a gas turbine combustion chamber and shows the direction of the combustion gas flow in 7, hence, the Helmholtz resonator is positioned on a side wall of the combustion chamber. GB '660 does not teach the side wall is on an inner circumference of the combustion chamber and the use of multiple resonators of different volumes for the diametrically opposed resonators. Bodine, Jr.

teaches a combustion chamber for a gas turbine engine (Fig. 2) comprising a plurality of resonators 70, 71, 70b, 72 (see col. 6, lines 10+), one of which 72 is a Helmholtz resonator on an inner circumference of the combustion chamber, each Helmholtz resonator having a cavity and a damping tube in flow communication with the interior of the combustion chamber. Bodine, Jr does not teach in the embodiment of Fig. 2, multiple Helmholtz resonators although multiple resonators in general are taught. Another embodiment in Fig. 6 shows the use of multiple Helmholtz resonators 150 which are diametrically opposed and having different volumes and successively smaller volumes. It would have been obvious to one of ordinary skill in the art to employ multiple Helmholtz resonators with different volumes, in order attenuate multiple frequencies which are detrimental to combustion.

Allowable Subject Matter

5. Claim 16 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

6. Applicant's arguments filed 10/21/2005 have been fully considered and have overcome some of the art but they are not persuasive for Aigner in view of Bodine, Jr and are moot with regards to the new art cited above.

7. With regard to the Bodine reference, in Fig. 2 the Helmholtz resonator 71 is located on the inner circumference of the combustion chamber and hence teaches the

location for the resonators. The use of multiple circumferentially spaced resonators with different sizes would be immediately envisioned when viewed in combination with Fig.

6.

8. With regard to Aigner and Bodine, Jr. applicant's argument that Bodine, Jr. "appears to be" is merely an opinion and not based on a specific teaching of the reference. However, this is not merely opinion but is based on specific illustration of Bodine, Jr. which does not show any airflow in that area. Furthermore, the resonator of Bodine, Jr. is in an enclosed area and the location of the Helmholtz resonator is near the downstream area of the combustor and the analogous location in Aigner is within the windage shield 33. Hence, one of ordinary skill in the art would employ a Helmholtz resonator in that region as the analogous location and/or in order to reduce flow losses. Applicant argues that the "function of a windage shield" is not recognized. However, as there is no structural differentiation from the claims with respect to Aigner, the enclosed structure including 33 inherently forms a windage shield as it is exposed to the airflow.

9. As for the arguments regarding Pandalai, applicant alleges that the structural loading of the quarter wave resonator is different from that of the Helmholtz resonator but provides no evidentiary support.

10. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning.

But so long as it takes into account only knowledge which was within the level of

ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information


Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Ted Kim whose telephone number is 571-272-4829. The Examiner can be reached on regular business hours before 5:00 pm, Monday to Thursday and every other Friday.

The fax numbers for the organization where this application is assigned are 571-273-8300 for Regular faxes and 571-273-8300 for After Final faxes.

Art Unit: 3746

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Thorpe, can be reached at 571-272-4444.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist of Technology Center 3700, whose telephone number is 703-308-0861. General inquiries can also be directed to the Patents Assistance Center whose telephone number is 800-786-9199. Furthermore, a variety of online resources are available at <http://www.uspto.gov/main/patents.htm>

 Ted Kim	Telephone	571-272-4829
Primary Examiner	Fax (Regular)	571-273-8300
December 7, 2005	Fax (After Final)	571-273-8300
Technology Center 3700 Receptionist	Telephone	703-308-0861
Patents Assistance Center	Telephone	800-786-9199